

SECTION 15845 - AIR TERMINALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Single-duct air terminals.
 - 2. Fan Powered Air Terminal Units.
- B. Related Sections include the following:
 - 1. Division 15 Section "Duct Insulation" for external insulation of air terminals.
 - 2. Division 15 Section "Control Systems and Equipment" for control devices installed on air terminals.

1.3 SUBMITTALS

- A. Product Data: Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories for each model indicated. Include a schedule showing drawing designation, room location, number furnished, model number, size, and accessories furnished.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring.
- C. Maintenance Data: List of parts for each type of air terminal and troubleshooting maintenance guide to include in the maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

- A. Product Options: Drawings and schedules indicate requirements of air terminals and are based on specific systems indicated. Other manufacturers' systems with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."
- B. Listing and Labeling: Provide electrically operated air terminals specified in this Section that are listed and labeled.
- C. NFPA Compliance: Install air terminals according to NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems."
- D. Comply with NFPA 70 for electrical components and installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering air terminals that may be incorporated into the Work include, but are not limited to, the following:
1. Air System Components; Krueger Div.
 2. Anemostat Products Div.
 3. Carrier Corp.
 4. Nailor Industries Inc.
 5. Titus.
 6. Trane Co. (The).
 7. Tuttle & Bailey, Hart & Cooley, Inc.
 8. York International Corp. (Tempmaster)

2.2 SINGLE-DUCT AIR TERMINALS

- A. Configuration: Volume-damper assembly inside unit casing. Locate control components inside protective metal shroud.
- B. Casings: Steel or aluminum sheet metal of the following minimum thicknesses:
1. Upstream Pressure Side: 0.0239-inch (0.6-mm) steel.
 2. Downstream Pressure Side: 0.0179-inch (0.45-mm) steel.
- C. Casing Lining: Minimum of 1/2-inch- (13-mm-) thick, neoprene- or vinyl-coated, fibrous-glass insulation; 1.5-lb/cu. ft. (24-kg/cu. m) density, complying with NFPA 90A requirements and UL 181 erosion requirements. Secure lining to prevent delamination, sagging, or settling.
1. Coat liner surfaces and edges with erosion-resistant coating or cover with perforated metal.
- D. Plenum Air Inlets: Round stub connections or S-slip and drive connections for duct attachment.
- E. Plenum Air Outlets: S-slip and drive connections.
- F. Access: Removable panels to permit access to dampers and other parts requiring service, adjustment, or maintenance; with airtight gasket and quarter-turn latches.
- G. Volume Damper: Construct of galvanized steel with peripheral gasket and self-lubricating bearings.
1. Maximum Damper Leakage: 2 percent of nominal airflow at 1-inch wg (250-Pa) inlet static pressure.
- H. Attenuator Section: Line with 2-inch- (50-mm-) thick, neoprene- or vinyl-coated, fibrous-glass insulation.
- I. Round Outlet: Discharge collar matching inlet size.
- J. Hot-Water Heating Coil: Copper tube, mechanically expanded into aluminum-plate fins; leak tested underwater to 200 psig (1380 kPa); and factory installed.

- K. Electronic Controls: Bidirectional damper operator and microprocessor-based controller with integral airflow transducer and room sensor provide control with the following features:
1. Proportional plus integral control of room temperature.
 2. Time-proportional reheat-coil control.
 3. Occupied/unoccupied operating mode.
 4. Remote reset of airflow or temperature set points.
 5. Adjusting and monitoring with portable terminal.
 6. Communication with temperature-control system specified in other Division 15 Sections.

2.3 FAN-POWERED AIR TERMINAL UNITS

A. Available Manufacturers:

1. Anemostat; a Mestek Company.
2. Carnes.
3. Krueger.
4. METALAIR, Inc.; Metal Industries Inc.
5. Nailor Industries of Texas Inc.
6. Price Industries.
7. Titus.
8. Trane Co. (The); Worldwide Applied Systems Group.

B. Configuration: Volume-damper assembly and fan in series arrangement inside unit casing with control components inside a protective metal shroud.

C. Casing: 20 gauge galvanized steel.

1. Casing Lining: **1/2-inch- (13-mm-)** non-porous sealed liner which complies with UL 181 and NFPA 255, 1.5 lb density. Exposed insulation shall be non-fibrous or fiberglass insulation shall be sealed from the air stream with a foil reinforced liner or solid metal lining.
2. Air Inlets: Round stub connections or S-slip and drive connections for duct attachment.
3. Access: Removable panels for access to dampers and other parts requiring service, adjustment, or maintenance; with airtight gasket and quarter-turn latches.

D. Volume Damper: Galvanized steel with peripheral gasket and self-lubricating bearings.

1. Maximum Damper Leakage: ARI 880 rated, 3 percent of nominal airflow at 3-inch wg (750-Pa) inlet static pressure.

E. Fan Section: Galvanized-steel plenum, with direct-drive, forward-curved fan with air filter and backdraft damper.

1. Lining: Same as casing.
2. Motor: Energy efficient permanent split capacitor type with integral thermal overload protection and permanently lubricated bearings and be specifically designed for use with an SCR for fan speed adjustment.
 - a. Fan-Motor Assembly Isolation: Rubber isolators.
3. Air Filter: 1-inch- (25-mm-) thick, fiberglass throwaway.

- F. Attenuator Section: 0.034-inch (0.85-mm) steel. Constructed as required to obtain sound rating not to exceed NC30 at 1.5" inlet static pressure and 1" discharge static pressure. Lining to comply with same requirements as casing lining.
- G. Factory-Mounted and -Wired Controls: Electrical components shall be mounted in control box with removable cover. Incorporate single-point electrical connection to power source.
 - 1. Control Transformer: Factory mounted for control voltage on electric and electronic control units with terminal strip in control box for field wiring of thermostat and power source.
 - 2. Wiring Terminations: Fan and controls to terminal strip, and terminal lugs shall match quantities, sizes, and materials of branch-circuit conductors. Enclose terminal lugs in terminal box that is sized according to NFPA 70.
 - 3. Disconnect Switch: Factory-mounted, fused type.
- H. Control Panel Enclosure: NEMA 250, Type 1, with access panel sealed from airflow and mounted on side of unit.
- I. Electronic Controls: Bidirectional damper operator and microprocessor-based controller with integral airflow transducer and room sensor shall be compatible with temperature controls specified in Division 15 Section "HVAC Instrumentation and Controls" and shall have the following features:
 - 1. Proportional, plus integral control of room temperature.
 - 2. Time-proportional reheat-coil control.
 - 3. Occupied and unoccupied operating mode.
 - 4. Remote reset of airflow or temperature set points.
 - 5. Adjusting and monitoring with portable terminal.
 - 6. Communication with temperature-control system specified in Division 15 Section "HVAC Instrumentation and Controls."
- J. Control Sequence:
 - 1. With central system fan operating in occupied mode, sequence the controls as follows:
 - a. When primary duct is pressurized, modulate volume damper to maintain room temperature.
 - b. On reduced-cooling demand, close volume damper.
 - c. As cooling demand increases, increase air terminal fan speed.
 - d. If central duct system pressure varies, modulate volume damper to maintain constant primary airflow.
 - e. If no cooling demand, control enters field-adjustable, no-load band.
 - f. On heating demand, energize heating coil.

2.4 SOURCE QUALITY CONTROL

- A. Testing Requirements: Test and rate air terminals according to ARI 880, "Industry Standard for Air Terminals."
- B. Identification: Label each air terminal with plan number, nominal airflow, maximum and minimum factory-set airflows, coil type, and ARI certification seal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install air terminals level and plumb, according to manufacturer's written instructions, rough-in drawings, original design, and referenced standards; and maintain sufficient clearance for normal service and maintenance.
- B. Connect ductwork to air terminals according to Division 15 ductwork Sections.

3.2 CONNECTIONS

- A. Install piping adjacent to air terminals to allow service and maintenance.
- B. Electrical: Comply with applicable requirements in Division 16 Sections.
- C. Ground equipment.
 - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 FIELD QUALITY CONTROL

- A. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 CLEANING

- A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris, and repair damaged finishes.

3.5 COMMISSIONING

- A. Verify that installation of each air terminal is according to the Contract Documents.
- B. Check that inlet duct connections are as recommended by air terminal manufacturer to achieve proper performance.
- C. Check that controls and control enclosure are accessible.
- D. Verify that control connections are complete.
- E. Check that nameplate and identification tag are visible.
- F. Verify that controls respond to inputs as specified.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:

1. Train Owner's maintenance personnel on procedures and schedules related to startup and shut-down, troubleshooting, servicing, and preventive maintenance.
2. Review data in the maintenance manuals. Refer to Division 1.
3. Schedule training with Owner, through Architect, with at least 7 days' advance notice.

END OF SECTION 15845